PP7/B. Stewart

FILE - Mission Rules

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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ALSEP 3

MARCH 23, 1970

PREPARED BY

FLIGHT CONTROL DIVISION

MANNED SPACECRAFT CENTER

HOUSTON, TEXAS

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ALSEP 3

FINAL SYSTEMS MISSION RULES FOR ALSEP 3

PREFACE

THIS DOCUMENT CONTAINS THE SYSTEMS MISSION RULES FOR ALSEP 3 AS OF MARCH 23, 1970. THIS AND ALL SUBSEQUENT REVISIONS TO THIS DOCUMENT WILL BE PRINTED ON DIFFERENT COLORED PAGES FOR EASY RECOGNITION.

IT IS REQUESTED THAT ANY ORGANIZATION HAVING COMMENTS, QUESTIONS, OR SUGGESTIONS CONCERNING THESE MISSION RULES CONTACT MR. JOHN H. TEMPLE, FLIGHT CONTROL OPERATIONS BRANCH, BUILDING 45, ROOM 646, PHONE 483-3838.

ANY REQUESTS FOR ADDITIONAL COPIES OR CHANGES TO THE DISTRIBUTION LIST IN APPENDIX B OF THIS DOCUMENT MUST BE MADE IN WRITING TO MR. SIGURD A. SJOBERG, DIRECTOR OF FLIGHT OPERATIONS, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS.

THIS IS A CONTROL DOCUMENT AND ANY CHANGES ARE SUBJECT TO THE CHANGE CONTROL PROCEDURES DELINEATED IN APPENDIX C. THIS DOCUMENT IS NOT TO BE REPRODUCED WITHOUT THE WRITTEN APPROVAL OF THE CHIEF, FLIGHT CONTROL DIVISION, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS.

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' INTRODUCTION & PURPOSE '

MISSION RULES ARE PROCEDURAL STATEMENTS WHICH PROVIDE FLIGHT CONTROL PERSONNEL WITH GUIDELINES TO EXPEDITE THE DECISION-MAKING PROCESS. THE RULES ARE BASED ON AN ANALYSIS OF MISSION EQUIPMENT CONFIGURATION, SYSTEMS OPERATIONS AND CONSTRAINTS, AND MISSION OBJECTIVES. THE DIRECTOR OF FLIGHT OPERATIONS, MANNED SPACECRAFT CENTER, HOUSTON, TEXAS, HAS THE OVERALL RESPONSIBILITY FOR THE PREPARATION, CONTENTS, AND CONTROL OF THE SYSTEMS MISSION RULES FOR ALSEP.

THE ALSEP MISSION RULES ARE PUBLISHED UNDER SEPARATE COVER FROM THE FLIGHT MISSION RULES BECAUSE OF THE DIFFERENCE IN LIFETIME OF THE ALSEP OPERATION AND SPECIFIC MISSION ORIENTATED ACTIVITIES. THE ALSEP MISSION RULES DOCUMENT WILL CONTAIN ALL ALSEP MISSION RULES INCLUDING---

A. ALL MISSION RULES EFFECTING CREW INTERFACE WITH THE ALSEP AND

B. ALL MISSION RULES EFFECTING MCC INTERFACE WITH THE ALSEP, THROUGH ALSEP SYSTEMS LIFETIME.

THE FLIGHT MISSION RULES, IN ADDITION TO THIS DOCUMENT, WILL CONTAIN ALL ALSEP RULES INVOLVING FLIGHT CREW INTERFACE.

THE FLIGHT MISSION RULES WILL TAKE PRECEDENCE SHOULD ANY CONFLICTS EXIST BETWEEN THIS DOCUMENT AND THE FLIGHT MISSION RULES BECAUSE OF REVISION CYCLES.

MISSION RULES CAN BE CATEGORIZED AS GENERAL AND SPECIFIC. GENERAL MISSION RULES CONTAIN THE BASIC PHILOSOPHIES USED IN THE DEVELOPMENT OF THE ALSEP MISSION RULES. SPECIFIC MISSION RULES PROVIDE THE BASIC CRITERIA FROM WHICH REAL-TIME DECISIONS ARE MADE AND WILL BE FORMATTED AS FOLLOWS---

A. THE CONDITION/MALFUNCTION COLUMN DEFINES THE FAILURE.

B. THE PHASE COLUMN IDENTIFIES THE TIME INTERVAL IN WHICH THE CONDITION/MALFUNCTION OCCURS.

C. THE RULING COLUMN DEFINES FLIGHT CONTROLLER ACTION AND/OR PROCEDURES THAT MUST BE ACCOMPLISHED AS A RESULT OF THE CONDITION.

D. THE CUES/NOTES/COMMENTS COLUMN PROVIDES THE FLIGHT CONTROLLER WITH ADDITIONAL INFORMATION CONCERNING THE CONDITION/MALFUNCTION AND/OR RULING.

REV	ITEM	
		' GENERAL '
	2-1	THE ALSEP MISSION RULES OUTLINE PREPLANNED DECISIONS DESIGNED TO MINIMIZE THE AMOUNT OF REAL-TIME RATIONALIZATION REQUIRED WHEN NON-NOMINAL SITUATIONS OCCUR AFTER CREW ACTIVATION.
	2-2	WHEN A CONFLICT OF PLANNED ACTIVITIES OCCURS, THE ALSEP SENIOR ENGINEER WILL DETERMINE THE PRIORITY OF ACTIVITIES.
	2-3	IN SOME INSTANCES, THE SPECIFIC MISSION RULES MAY DEVIATE FROM THE GENERAL GUIDELINES OR FROM THESE GENERAL RULES. THE SPECIFIC MISSION RULE WILL APPLY IN ALL CASES, AND THE DEVIATIONS FROM THE GENERAL GUIDELINES WILL BE NOTED.
	2-4	THE ALSEP SENIOR ENGINEER MAY, AFTER ANALYSIS OF THE OPERATION, CHOOSE TO TAKE ANY NECESSARY ACTION REQUIRED FOR SUCCESSFUL COMPLETION OF ALSEP TEST OBJECTIVES.
	2-5	MISSION RULE LIMITS THAT ARE CONSIDERED TO BE INTERIM OR UNCONFIRMED NUMBERS WILL BE UNDERLINED IN THIS PUBLICATION AND ALL SUBSEQUENT REVISIONS UNTIL THE NUMBERS ARE CONFIRMED BY THE RESPONSIBLE NASA AGENCY.
	2-6	THE SYSTEMS LIMITS LISTED IN THESE RULES ARE THE ACTUAL VEHICLE LIMITS AS WELL AS THEY ARE KNOWN AND UNDERSTOOD AND ARE NOT BIASED TO COMPENSATE FOR TIME DELAYS OR INSTRUMENTATION ERRORS WITHIN THE ALSEP AND MSFN DATA/DISPLAY SYSTEMS.

REV	ITEM

' ALSEP OPERATIONAL GUIDELINE '

3-1 GENERAL

A. THESE ALSEP GENERAL OPERATIONAL GUIDELINES ARE BASED ON OBJECTIVES IN THE FOLLOWING PRIORITIES---

(1) PSEE
(2) HFE
(3) CPLEE
(4) CCGE
(5) ENGINEERING

B. THE GATHERING OF SCIENTIFIC DATA WILL NOT BE COMPROMISED FOR ENGINEERING OR TEST PURPOSES.

C. REDUNDANT OR BACKUP SYSTEMS WILL NOT BE SELECTED UNLESS A FAILURE WARRANTS SUCH ACTION. SWITCHING TO REDUNDANT SYSTEMS WILL NOT BE ACCOMPLISHED TO SATISFY ENGINEERING TESTS UNLESS ALL SCIENTIFIC MISSION OBJECTIVES HAVE BEEN COMPLETED.

D. BIT RATES WILL NOT BE CHANGED ON THE ALSEP UNLESS THIS ACTION WILL CORRECT CERTAIN SYNC PROBLEMS (FROM THAT OPERATIONAL MSFN SITE) OR UNLESS A CHANGE OF BIT RATE IS NECESSARY TO SATISFY CERTAIN SCIENTIFIC OBJECTIVES. IF THE BIT RATE IS CHANGED FROM THE NORM BECAUSE OF A MSFN PROBLEM, THE ALSEP WILL BE CONFIGURED BACK TO NORMAL (1.06 KBPS) PRIOR TO TERMINATION OF SUPPORT FROM THAT SITE.

E. BEFORE IMPLEMENTING ANY MISSION RULE ACTION BASED ON AN APPARENT ALSEP MALFUNCTION, IT WILL BE ASCERTAINED THAT THERE IS NO PROBLEM WITH THE MSFN SUPPORTING SITE.

F. THE TIMER INHIBIT COMMAND WILL NOT BE SENT PRIOR TO ALL EXPERIMENTS BEING ON AND PROPERLY ADJUSTED FOR OPTIMUM SCIENTIFIC DATA RETURN.

G. THE TIMER WILL NEVER BE INHIBITED WHILE THE ALSEP TRANSMITTER IS OFF, AND THE ALSEP TRANSMITTER WILL NEVER BE COMMANDED OFF WHILE THE TIMER IS INHIBITED. DURING NORMAL OPERATION THE TIMER WILL NOT BE INHIBITED AND THE TRANSMITTER WILL NOT BE COMMANDED OFF.

H. ALSEP EXPERIMENTS WILL NOT BE COMMANDED TO ''STANDBY OFF'' UNLESS THE ACTION IS JUSTIFIED BY AN ANOMALY.

I. ANYTIME THERE IS AN AUTOMATIC SWITCHOVER TO PCU NO. 2 NOT IDENTIFIABLE TO A FAILURE IN PCU NO. 1, A ONE-TIME COMMAND WILL BE ATTEMPTED TO RETURN TO PCU NO. 1 IF THE +12 VDC BUS IS GREATER THAN 11.8 VDC.

J. NO COMMAND FUNCTION CAN BE EXECUTED (OTHER THAN ''STANDBY OFF,'' ''STANDBY SELECT,'' OR ''OPERATE SELECT'') IN AN EXPERIMENT, BY GROUND COMMAND OR BY ONBOARD TIMER, UNLESS THE EXPERIMENT IS IN THE ''OPERATE'' MODE.

K. THE ALSEP TURN-ON SEQUENCE IS---

(1) ASTRONAUT ACTIVATES SHORTING PLUG SWITCH ASAP AFTER DEPLOYMENT OF THE PSE, CCGE, AND CPLEE.

(2) CREW WILL ACTIVATE ASTRO SWITCH NO. 1 PER DIRECTION FROM THE GROUND. SWITCH NO. 1 ACTIVATION WILL BE BASED ON PREDICTED AVAILABILITY OF 38.2 WATTS FROM THE RTG (SEE FIGURE 3.2-2, ALSEP SODB).

L. IF THE GROUND IS UNABLE TO COMMAND A TRANSMITTER ON AND/OR EXPERIMENTS ON, THE ASTRONAUT WILL TURN ON ASTRO SWITCHES NO. 2 AND/OR NO. 3 DURING EVA NO. 1 WHEN REQUESTED FROM THE GROUND.

M. THE CENTRAL STATION HEATERS AND PDR'S WILL BE UTILIZED TO MAINTAIN AN AVERAGE INTERNAL THERMAL PLATE TEMPERATURE WITH THE LOWEST TEMPERATURE GREATER THAN 20 DEG F. AND THE HIGHEST TEMPERATURE LESS THAN 125 DEG F. UNLESS THERE IS AN ANOMALY REQUIRING THE C/S HEATERS TO BE OFF.

N. IF ALSEP DEPLOYMENT TIME BECOMES CONSTRAINED AND THE CREW MUST RETURN TO THE LM, THE RTG SHORTING SWITCH AND ASTRONAUT SWITCH NO. 1 SHALL BE ACTUATED BY THE CREW IF THE ANTENNA IS LEVELED AND ALIGNED. IF THE ANTENNA IS NOT LEVEL AND ALIGNED, THESE SWITCHES SHALL NOT BE ACTUATED. (PICK UP HERE ON EVA NO. 2).

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ALSEP OPERATIONAL GUIDELINES (CONT)

3-2 PSE

A. THE PSE WILL BE UNCAGED ASAP AFTER THE PSE IS COMMANDED ON.

B. THE PSE LEVELING MOTORS WILL NOT BE ACTIVATED PRIOR TO UNCAGING.

C. AFTER PSE LEVELING OF THE HORIZONTAL COMPONENTS (LPX AND LPY) HAS BEEN COMPLETED, THE COARSE LEVEL SENSORS WILL BE GROUND COMMANDED OUT (VIA CMD 102).

D. FOR PROPER OPERATION OF THE PSE, THE FEEDBACK FILTER MUST BE IN THE FOLLOWING MODES (CMD 101, PSE FILTER IN/OUT)---

(1) LEVELING MODE--FILTER OUT

(2) LONG PERIOD CALIBRATION--FILTER IN

(3) NORMAL OPERATIONAL MODE--FILTER IN

E. THE X-AXIS AND Y-AXIS MASSES OF THE PSE SHOULD BE LEVEL BEFORE LEVELING THE Z-AXIS MASS.

F. THE PSE WILL BE RELEVELED AS INFREQUENTLY AS POSSIBLE.

G. DURING FORCED LEVELING OPERATIONS, CAUTION SHALL BE EXERCISED PRIOR TO INITIATING LEVELING MOTOR OPERATION TO INSURE THAT PROPER DIRECTION AND SPEED HAVE BEEN SELECTED.

REV	ITEM	

ALSEP OPERATIONAL GUIDELINES (CONT)

3-4 HFE

A. NO COMMANDS WILL BE UPLINKED TO THE HFE AT LESS THAN A 54-SECOND INTERVAL.

B. A CONDUCTIVITY EXPERIMENT WILL NOT BE INITIATED UNLESS THERE WILL BE SUFFICIENT POWER TO COMPLETE THE EXPERIMENT WITHOUT INTERRUPTION. ONCE A PROBE HEATER IS TURNED ON FOR AN EXPERIMENT IT WILL NOT BE TURNED OFF UNLESS THE EXPERIMENT IS TERMINATED.

C. THE DRILLING RATE FOR THE HFE IMPLACEMENT HOLES WILL BE USED TO DETERMINE THE GO/NO GO POINTS FOR THE TWO HOLES. THE GO/NO GO POINTS ARE AS FOLLOWS---

FIRST AND SECOND HOLE - A MAXIMUM OF 10 MINUTES POWER ON TIME WILL BE EXPENDED ON EACH HOLE.

(1) DEPTH LESS THAN 2 DRILL STRING SECTIONS--RETRACT DRILL AND START NEW HOLE IF RATE IS LESS THAN 1 SECTION PER 5 MINUTES, BASED ON THE RATE OBSERVED OVER 30 SECONDS. MOVE TO A NEW LOCATION ONLY TWICE PER HOLE.

(2) DEPTH GREATER THAN 2 DRILL STRING SECTIONS--PROCEED WITH DRILLING UNTIL 6 DRILL STRING SECTIONS ARE IMPLACED OR UNTIL 10 MINUTES OF POWER ON TIME HAS ELAPSED (TO PREVENT THE POSSIBILITY OF EXCESSIVE DRILL STRING JOINT WEAR).

3-4 CPLEE

GROUND COMMAND 113 (REMOVE DUST COVER) SHOULD NOT BE SENT TO THE ALSEP PRIOR TO LM LUNAR ASCENT.

3-5 CCGE

A. THE CCGE WILL BE COMMANDED TO OPERATE-SELECT TO VERIFY THAT IT IS OPERABLE AS SOON AFTER DEPLOYMENT AS POSSIBLE.

B. THE CCGE WILL NOT BE LEFT IN OPERATE-SELECT FOR LONGER THAN 5 MINUTES WITH THE DUST COVER INSTALLED.

C. GROUND COMMAND 105/107 (REMOVE DUST COVER) WILL NOT BE SENT PRIOR TO OPERATING THE CCGE IN BOTH THE CAL ENABLE MODE AND THE RANGE MODE A (NORMAL MODE).

REV	ITEM
	3-6

EXPERIMENT PRIORITY

A. AT DEPLOYMENT EXPERIMENT PRIORITIES ARE COMMENSURATE WITH THE MISSION PRIORITIES. THE PRIORITIES ARE AS FOLLOWS---

(1) PSE

(2) HFE

(3) CPLEE

(4) CCGE

(5) DUST DETECTOR - M515

B. DURING A NOMINAL ALSEP MISSION THE EXPERIMENTS WILL RETAIN THEIR PRIORITY AS LISTED ABOVE UNLESS THEY ARE CHANGED BY THE SCIENCE AND APPLICATIONS DIRECTORATE. HOWEVER, DURING CERTAIN PERIODS OF TIME DURING THE LUNAR CYCLE AN INDIVIDUAL EXPERIMENT OF LOWER PRIORITY MAY BE GIVEN AN ELEVATED LEVEL OF ATTENTION. THIS WILL BE BASED ON THE ABILITY OF THE EXPERIMENT TO RESPOND TO THE PHENOMENON OCCURRING.

(1) THE CPLEE WILL HAVE THE FOCUS OF ATTENTION DURING THE FIRST CROSSING OF THE EARTH'S BOW SHOCK WAVE. FOR SUBSEQUENT CROSSINGS OF THE BOW SHOCK WAVE ANOTHER EXPERIMENT MAY REPLACE THE CPLEE DEPENDING ON THE DATA OBTAINED DURING THE PREVIOUS CROSSINGS.

(2) DURING PREDICTED PERIODS OF ARRIVAL OF HIGH ENERGY PARTICLE RATES AT THE ALSEP SITE FROM SOLAR FLARES, THE CPLEE WILL HAVE THE FOCUS OF ATTENTION. DURING SUBSEQUENT FLARES ANOTHER EXPERIMENT MAY REPLACE THE CPLEE DEPENDING ON THE DATA OBTAINED FROM PREVIOUS FLARES.

(3) THE FOCUS OF ATTENTION WILL BE ON THE FOLLOWING EXPERIMENTS DURING THE FIRST TERMINATOR CROSSINGS (SUNSET AND SUNRISE)---

(A) PSE NO. 1 FROM 15 MINUTES BEFORE CROSSING UNTIL 1 HOUR AFTER CROSSING.

(B) CPLEE NO. 2 FROM 6 HOURS PRIOR UNTIL 12 HOURS AFTER SUNSET.

(C) CCGE NO. 2 FROM 2 HOURS PRIOR UNTIL 18 HOURS AFTER SUNRISE.

THE LISTED TIMES AND EXPERIMENTS MAY BE CHANGED FOR SUBSEQUENT TERMINATOR CROSSINGS AFTER THE FIRST.

(4) THE HFE WILL RECEIVE THE FOCUS OF ATTENTION DURING THE TIMES WHEN MODE CHANGES ARE BEING COMMANDED AND DURING THE TIMES WHEN THE PROBE HEATERS ARE ON FOR A CONDUCTIVITY EXPERIMENT.

REV	ITEM	
	3-7	INSUFFICIENT POWER FOR SIMULTANEOUS SUPPORT OF ALL EXPERIMENTS IN GENERAL, AUTO THERMAL CONTROL OF THE CENTRAL STATION AND THE EXPERIMENTS WILL BE INHIBITED IF ADEQUATE POWER IS NOT AVAILABLE. THERMAL CONTROL WILL BE MANUALLY MANAGED TO PRECLUDE RIPPLE OFF OF EXPERIMENTS. CENTRAL STATION AVERAGE TEMPERATURES WILL BE ALLOWED TO GO AS LOW AS -20 DEG F. IF THE HEATER POWER IS REQUIRED FOR OPERATION OF AN EXPERIMENT. EXPERIMENT COMMANDS, REQUIRING CENTRAL STATION POWER STATION HEATER POWER, THAT WOULD CAUSE THE CENTRAL STATION AVERAGE TEMPERATURE TO GO BELOW 0 DEG F. WILL BE HELD TO A MINIMUM.
	3-8	EXPERIMENT INTERFERES WITH ANOTHER EXPERIMENT OR THE CENTRAL STATION IF ANY EXPERIMENT IS DETERMINED TO BE A STEADY SOURCE OF INTERFERENCE TO ANOTHER EXPERIMENT, OPERATION OF THE INTERFERING EXPERIMENT WILL BE CURTAILED (BUT NOT TERMINATED) FOR AS LONG AS THE INTERFERING EXPERIMENT IS STILL RETURNING DATA. IN NO CASE WILL ANY EXPERIMENT BE REMOVED FROM ITS DESIRED OPERATIONAL CONFIGURATION FOR MORE THAN 80 PERCENT OF ANY LUNAR DAY (29.5 EARTH DAYS).

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-1	A. ST-01 FAILED CLOSED		A. DSS 3 HTR (10W)--OFF	A. DSS 3 HTR OFF--CMD 025 CUE--- UNEXPLAINED 10W DROP IN RESERVE POWER
		4-2 THROUGH 4-10 ARE RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-11	FAILURE OF AUTO SWITCHOVER TO PCU 2		SELECT PCU 2	PCU 2 SEL---CMD 062 AUTO SWITCHOVER TO PCU 2 SHOULD OCCUR AT +12 VDC OUT OF LIMITS (LESS THAN 11 VDC/GREATER THAN 13 VDC) CUE--- THE FOLLOWING TM WILL BE OUT-OF-LIMITS--- TM NOMINAL HI LO AE-9 +12 +13.0 +11.0 AE-7 +29 +31.3 +25.7 AE-8 +15 +16.2 +13.8 AE-10 +5 +5.4 +4.6 AE-11 -12 -11.0 -13.0 AE-12 -6 -5.5 -6.5 VERIFY AE-01, AE-02 CAL VOLTAGES ARE WITHIN LIMITS.
	4-12	RESERVE POWER LESS THAN 2.0W		COMMAND EXPERIMENTS TO '''STANDBY SELECT'' BEGINNING WITH THE LAST PRIORITY EXPERIMENT (REFER TO GUIDELINE SECTION 6 EXPERIMENT PRIORITIES).	CUE--- CS2 FOR PCU 1 CS4 FOR PCU 2
		4-13 TO 4-20 RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-21	ALSEP FAILS TO RESPOND TO A COMMAND		A. REINITIATE THE COMMAND	CUE---
				B. IF UNSUCCESSFUL, SELECT OTHER DECODER (ALSEP 3A OR 3B) AND REINITIATE THE COMMAND.	NO FUNCTIONAL VERIFICATION AND NO CMD VERIFICATION WORD (CVW) VERIFY RECEIVER CB (CB-01) HAS OPENED. AE-14 OR AE-13 OUT-OF-LIMITS. 12-HR PULSE WILL CLOSE CB.
	4-22	FAILURE OF 12 HOUR TIMER		A.1. INITIAL 45 DAYS SUPPORT--- IF ANY TWO OF THE FOLLOWING TEMPS IS BETWEEN -20 DEG F AND +155 DEG F, CONTINUE REAL TIME SUPPORT THRU 45 DAYS--- AT31, CMD DEC BASE T AT32, CMD DEC INT T AT33, CMD DEC VCO T	THE TIMER WILL BE DEEMED FAILED AFTER NOT RECEIVING A SPECIFIED NUMBER OF CONSECUTIVE 12 HOUR PULSES AS A FUNCTION OF AT07, THERMAL PLATE 5 TEMP. AT07 / NUMBER OF CONSECUTIVE MISSED 12 HR PULSES GREATER THAN -20 DEG F OR LESS THAN +155 DEG F — 10 LESS THAN -20 DEG F — 2 GREATER THAN +155 DEG F — 5
				2. AFTER THE INITIAL 45 DAYS, THE TRANSMITTER WILL BE LEFT ON PROVIDING THE ALSEP IS--- (A) RETURNING VALID SCIENTIFIC DATA (B) THERE IS NO INDICATION OF FAILURE OR EMMINENT FAILURE IN THE COMMAND SYSTEM	THE FOLLOWING WILL BE GIVEN CONSIDERATION IN PREDICTING THE EMINENT FAILURE OF THE COMMAND SYSTEM--- 1. IS THE COMMAND SYSTEM TEMP. WITHIN 10 PERCENT OF ITS VALUE AT THE SAME SUN ANGLE DURING THE PREVIOUS LUNAR DAYS. 2. IS THE ALSEP RESPONDING NORMALLY TO ALL COMMANDS. 3. IS A CVW BEING RECEIVED AFTER A MINIMUM OF 99 PERCENT OF THE COMMANDS TRANSMITTED.
		4-23 TO 4-25 RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-26	WEAK TM SIGNAL		A. SELECT REDUNDANT XMTR	A. XMTR A SEL---CMD 012 XMTR B SEL---CMD 015
				B. SELECT LOW BIT RATE	B. LOW BIT RATE SEL---CMD 007
	4-27	LOSS OF SYNC OR BAD DECOMMED DATA		A. SELECT REDUNDANT PROCESSOR	A. PROC "X" SEL---CMD 034 PROC "Y" SEL---CMD 035
				B. SELECT LOW BIT RATE	B. LOW BIT RATE SELECT---CMD 007
	4-28	LOSS OF TM SIGNAL		A. SEND TM ON.	A. TM ON---CMD 013
				B. SELECT REDUNDANT XMTR	B. XMTR A SEL---CMD 012 XMTR B SEL---CMD 015
				C. AFTER NEXT 12 HR PULSE--- REPEAT A&B.	C. IF RCVR CB (CB-01) OPEN, NEXT 12 HR PULSE WILL RESET IT. NOTE--- IF PSE LEVELING IS IN PROGRESS, SEND PSE STBY SEL--- CMD 043
	4-29	DATA DEMAND SIGNAL FROM DATA PROCESSOR FAILS HIGH		SELECT REDUNDANT PROCESSOR USING THE OTHER DECODER. DO NOT RETURN TO FAILED PROCESSOR.	CUE--- CVW IS STEADILY INDICATING AN ERRONEOUS PATTERN OTHER THAN ALL ZEROS (CVW LIGHT ON EVERY 0.6 SECONDS) AFTER A CMD HAS BEEN SENT. DISABLE CMD TO FAILED PROCESSOR. PROC "X" SEL--CMD 034 PROC "Y" SEL--CMD 035
	4-30	LOSS OF ANY TM PARAMETER IN FIRST 15 CHANNELS OF 90 CHANNEL MULTIPLEXER		SELECT REDUNDANT PROCESSOR	DO NOT APPLY IF MISSION RULE 31-29 HAS BEEN INVOKED.

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-31	FAILURE OF AUTOMATIC LEVELING MODE		PERFORM FORCED LEVELING BY GROUND COMMANDS	PSE ACTIVATION PRESETS LEVELING MODE TO AUTOMATIC. CMD 103 WILL SWITCH TO FORCED MODE. CMD 103 IS A TWO-STATE CMD, PSE LEVELING MODE AUTO/FORCED.
	4-32	PSE LEVELING MOTOR FAILS ON		ALTERNATELY GND CMD PSE TO STANDBY SELECT AND TO OPERATE SELECT	CUE--- LEVELING MOTOR WILL DRAW 3 WATTS FROM RESERVE POWER. PSE STBY SEL--CMD 043 PSE OPER. SEL--CMD 042
	4-33	PSE LEVELING MOTOR FAILS OFF		NO ACTION TO BE TAKEN	CUE--- NO DROP IN RESERVE POWER (NORMALLY 3 WATTS) WHEN REPEATED EFFORTS ARE MADE TO TURN MOTOR ON, AND NO ACTIVITY ON SHORT PERIOD Z-DATA CHANNEL.
	4-34	FAILURE OF MECHANICAL LEVEL DRIVE		SELECT LOW SPEED AND HIGH SPEED AND DIRECTION REVERSALS ALTERNATELY.	CUE--- NO MOTION OF THE PLATFORM CAN BE DETECTED ON THE LP HORIZONTAL OR LP-Z COMPONENT TIDAL OUTPUT. X-MTR ON/OFF--CMD 070 Y-MTR ON/OFF--CMD 071 Z-MTR ON/OFF--CMD 072 DIRECTION PLUS/MINUS--CMD 074 SPEED LOW/HIGH--CMD 075
	4-35	MISALIGNED COARSE SENSOR		A. COMMAND COARSE SENSOR OUT WHEN CORRESPONDING MOTOR IS IN LEVELING OPERATION. B. PERFORM FORCED LEVELING OF THE PSE BY GND CMD.	WHILE IN FINAL LEVELING PHASE (LOW STEPPING RATE), THE MOTOR REVERTS TO A HIGH STEPPING RATE REPEATEDLY WITHOUT ACHIEVING CENTERING. COARSE LEVEL SENSOR AND GIMBAL WILL NEVER ALIGN, AND THE MOTOR WILL CONTINUE TO DRIVE BEYOND LEVEL. COARSE SENSOR OUT--CMD 102
	4-36	FAILURE OF COARSE LEVEL SENSOR		A. SELECT FORCED PSE LEVELING MODE. B. GROUND COMMAND COARSE LEVEL SENSOR OUT. 1. PROCEED WITH INITIAL FORCED LEVELING FOR COARSE LEVELING. 2. USE AUTO MODE FOR FINE LEVELING.	CUE--- NO HIGH SPEED MOTOR OPERATION IS NOTICED DURING INITIAL LEVELING PHASE AND COMPONENT DOES NOT CENTER WITHIN EXPECTED TIME (35 MINUTES MAXIMUM IN AUTO MODE). USE HIGH SPEED LEVELING FOR COARSE LEVELING. CMD 103--PSE LEVELING MODE AUTO/FORCED. CMD 102--COARSE LEVEL SENSOR OUT

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-37	LONG PERIOD COMPONENT STICKS		A. USE HIGH SPEED, FORCED LEVELING IN DIRECTION WHICH PULLS MASS AWAY FROM STOP.	CUE--- FAILURE TO CENTER WITHIN EXPECTED TIME (35 MINUTES MAXIMUM IN AUTO MODE). IF STEPS A AND B FAIL, LP COMPONENT IS DEFECTIVE.
				B. IF UNSUCCESSFUL, SELECT LOW SPEED AND HIGH SPEED AND DIRECTION REVERSALS ALTERNATELY.	NOTE--- DO NOT EXCEED 5 MIN 30 SEC IN HIGH SPEED. X-MTR ON/OFF--CMD 070 Y-MTR ON/OFF--CMD 071 Z-MTR ON/OFF--CMD 072 DIRECTION PLUS/MINUS--CMD 074 SPEED HIGH/LOW--CMD 075
	4-38	ELECTRICAL FAILURE OF LONG PERIOD COMPONENT		TERMINATE LEVELING OF THE AFFECTED AXIS AFTER COARSE SENSOR PHASE IS COMPLETED	CUE--- TIDAL OUTPUT IS WITHIN RANGE, BUT IS NOT AFFECTED BY LEVELING OR CENTERING DRIVE.
	4-39	AUTOMATIC SWITCHOVER OF PSE TO STANDBY		CMD PSE TO OPERATE SELECT	IF CIRCUIT BREAKER CB-07 HAS OPENED FROM OVERCURRENT (500 MA +/- 10 PERCENT), STANDBY MODE WILL BE SELECTED AND THE CB WILL BE RESET AUTOMATICALLY. PSE OPER SEL--CMD 042
	4-40	FAILURE OF PSE UNCAGE SEQUENCE		A. TO UNCAGE ARM---	NORMAL UNCAGING IS ACCOMPLISHED BY SENDING CMD 073-- UNCAGE ARM/FIRE--TWICE, ONCE TO ARM AND ONCE TO FIRE THE ACTUATOR.
				1. SEND UNCAGE ARM/FIRE.	
				2. IF UNSUCCESSFUL, FIRST 12 HR TIMER PULSE WILL ARM ACTUATOR.	NOTE--- UNCAGING MAY NOT BE POSSIBLE UNLESS ATO5 THERMAL PLATE 3 TEMP IS ABOVE +25 DEG F.
				3. IF UNSUCCESSFUL, 96 HR +2 MIN PULSE FROM DELAYED CMD SEQUENCER WILL ARM ACTUATOR.	NOTE--- SELECTING PSE STANDBY WILL RESET ARM LOGIC IF ACTUATOR IS NOT FIRED.
				B. TO UNCAGE FIRE (AFTER ACTUATOR HAS BEEN ARMED).	NOTE--- 30 SEC IS REQUIRED BETWEEN ARM AND FIRE TO CHARGE CAPACITOR.
				1. SEND UNCAGE ARM/FIRE	
				2. IF UNSUCCESSFUL, SEND CMD 043 PSE STANDBY SEL, THEN CMD 042 PSE OPERATE SEL.	
				3. IF UNSECCESSFUL, NEXT 12-HR TIMER PULSE WILL FIRE THE ACTUATOR.	

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-41	PSE GOES OFF WHILE IN STANDBY MODE		DURING NORMAL OPERATIONS, CMD PSE TO STBY SEL	CUE--- EXP 2 STBY DISCRETE EXTINGUISHED, AND RESERVE POWER INCREASES SINCE POWER IS REMOVED FROM THE HEATERS. IF FUSE (F-04) HAS BEEN BLOWN BY OVERCURRENT (500MA), CAPABILITY TO SELECT PSE STBY MODE IS LOST. CMD 043--PSE STBY SEL CMD 017--PDR 1 ON
	4-42	PSE TEMP LOW AND AUTO THERMAL CONTROL FAILS		COMMAND HEATER TO FORCED ON	ASSUME AUTOMATIC THERMOSTAT CONTROL FAILED. CMD 076 IS A 4-STATE CMD, WHICH CAN SEQUENTIALLY STEP THRU THE FOLLOWING MODES TO CONTROL THE PSE SENSOR HEATER. 1. AUTO OFF 2. FORCED HTR ON 3. FORCED OFF 4. AUTO ON DL-07 PSE INSTRUMENT TEMP LOW LIMIT IS 125 DEG F. MINIMUM OF 5 WATTS RESERVE POWER IS REQUIRED.
	4-43	PSE TEMP HIGH AND AUTO THERMAL CONTROL FAILS		A. COMMAND HEATER TO FORCED OR AUTO OFF	A. CMD 076 IS 4-STATE CMD. 1. AUTO OFF 2. FORCED HTR ON 3. FORCED OFF 4. AUTO ON DL-07 PSE INSTRUMENT TEMP HIGH LIMIT IS +127 DEG. F.
				B. IF UNSUCCESSFUL, CMD PSE TO STBY, THEN TO OPERATE	B. SELECTING PSE TO STBY WILL REINITIALIZE TO AUTOMATIC THERMOSTAT CONTROL.
	4-44	LOSS OF DOWNLINK DURING LEVELING MOTOR OPERATION		SEND PSE STBY SEL	NOTE--- PSE STBY SEL WILL STOP MOTORS.
		4-45 TO 4-50 RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-51	UNABLE TO DRILL NOMINAL HFE EMPLACEMENT HOLES			
		A. NEITHER HOLE DEEP ENOUGH TO EMPLACE HFE PROBES		A. LAY PROBES ON HORIZONTAL LUNAR SURFACE AND COVER PROBES AND FIRST 6 FEET OF CABLE WITH DUST AS MUCH AS POSSIBLE	A. HOLE IS NOT DEEP ENOUGH TO EMPLACE A HFE PROBE IF THE DRILL STRING SECTIONS WILL NOT STAND UNATTENDED.
		B. HOLES NOT NOMINAL DEPTH		B. ADD 1 DRILL STRING TO SUPPORT PROBE IF NECESSARY. PLACE PROBES IN HOLES AS FAR AS THEY WILL GO	
	4-52	HAVE CHOICE OF DRILLING 2ND HFE HOLE OR CORE SAMPLE HOLE.		DRILL 2ND HFE PROBE EMPLACEMENT HOLE.	HFE HAS PRIORITY OVER CORE SAMPLE.
		4-53 TO 4-60 RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-61	CCGE DUST COVER COMES OFF DURING DEPLOYMENT.		DO NOT TRY TO REINSTALL.	DUST FROM ASTRONAUT GLOVES DOES MORE HARM THAN HAVING COVER OFF.
	4-62	UNABLE TO BREAK CCGE SEAL.		WAIT FOR DELAYED TIMER TO INITIATE COMMANDS.	96 HR + 2 MIN SET SEAL BREAK 96 HR + 4 MIN EXECUTE SEAL BREAK CCGE MUST BE IN OPERATE SELECT AT THE TIME OF THE 96 HOUR PULSES.
	4-63	UNEXPECTED CHANGE IN CCGE MODE OR RANGE		CMD TO STANDBY- A. IF CCGE TEMP. IS DECREASING WAIT FOR A DELTA TEMP. OF 1 DEG AND RESET THE EXP. B. IF CCGE TEMP. IS INCREASING WAIT UNTIL IT HAS DECREASED TO 1 DEG BELOW TEMP. AT WHICH ARCING OCCURRED, AND RESET THE EXPERIMENT.	USE DG-08 AS TEMP. REFERENCE.
		4-64 TO 4-70 RESERVED			

REV	ITEM	CONDITION/MALFUNCTION	PHASE	RULING	CUES/NOTES/COMMENTS
	4-71	CPLEE DUST COVER COMES OFF DURING DEPLOYMENT		DO NOT REINSTALL	CONTINUE DEPLOYMENT
	4-72	UNABLE TO REMOVE CPLEE DUST COVER		WAIT FOR DELAYED TIMER TO INITIATE CMD.	96 HR + 2 MIN--CPLEE DUST COVER REMOVAL. CPLEE MUST BE IN OPERATE SELECT AT THE TIME OF THE 96 HOUR PULSES.
	4-73	UNABLE TO MAINTAIN THERMAL INTEGRITY IN CPLEE		INT T LESS THAN = 10 DEG C CMD HTR ON IN FORCED MODE---CMD 111 IF IN FORCED MODE AND INT T GREATER THAN +10 DEG C CMD HTR OFF --- CMD 112	THERMOSTAT IS SET 0 DEG C +/- 10 DEG C.
	4-74	THERMOSTAT FAILED			
		A. CLOSED -(HTR ON) TEMP GREATER THAN +10 DEG C		A. REVERT TO FORCED HTR CONTROL AS IN MR 4-73	USE AC-6 AS TEMP REFERENCE
		B. OPEN -(HTR OFF) TEMP LESS THAN -10 DEG C		B. REVERT TO FORCED HTR CONTROL AS IN MR 4-73	
	4-75	UNEXPECTED CHANGE IN CPLEE MODE OR OR SEQUENCE.		CMD TO STANDBY	
				A. IF CPLEE TEMP. IS DECREASING WAIT FOR A DELTA TEMP. OF 1 DEG. AND RESET THE EXP.	USE AC-05 AS TEMP. REFERENCE.
				B. IF CPLEE TEMP. IS INCREASING WAIT UNTIL IT HAS DECREASED TO 1 DEG. BELOW THE TEMP. AT WHICH THE UNEXPLAINED CHANGES OCCURED AND RESET THE EXP.	
	4-76	INT. TEMP GREATER THAN +66 DEG C WITH DUST COVER ON, IN OPER SEL.		CMD TO STBY SEL	CUE--- USE AC-06 AS TEMP. REFERENCE.
		4-77 TO 4-80 RESERVED			

REV	ITEM

AC	ALTERNATING CURRENT
A/DC	ANALOG-TO-DIGITAL CONVERTER
ADC	AMPERES DC
ADD	ADDRESS
ALIGN	ALIGNMENT
ALSEP	APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE
A/F	AUTOMATIC/FORCED
AMPS	AMPERES
ANT	ANTENNA
AUTO	AUTOMATIC
AZ	AZIMUTH
BL	BOTTOM LOCATION OF STRUCTURE TEMPERATURE
BAS	BASE
BER	BIT ERROR RATE
BPS	BITS PER SECOND
CAL	CALIBRATE
CB	CIRCUIT BREAKER
CCGE	COLD CATHODE GAGE EXPERIMENT (PART OF SIDE ON ALSEP 1 AND 4, SEPARATE MSC EXPERIMENT ON ALSEP 3)
CCGE/A, CCGE/D	ANALOG AND DIGITAL ID READOUT FROM CCGE
CCIG	COLD CATHODE ION GAGE (INSTRUMENT PORTION OF CCGE)
CCW	COUNTERCLOCKWISE
CH	CHANNEL
CHAN	CHANNELTRON-- USED IN CPE AS--- CHAN/1 CHANNELTRON P/S NO. 1 CHAN/2 CHANNELTRON P/S NO. 2 CHAN/HI CHANNELTRON VOLTAGE INCREASES OFF CHAN/LO CHANNELTRON VOLTAGE INCREASES OFF
CMD	COMMAND
CNT	COUNT
CNTR	COUNTER
CONV	CONVERTER
CPLEE OR CPE	CHARGED-PARTICLE EXPERIMENT (FULL NAME IS CHARGED-PARTICLE LUNAR ENVIRONMENT EXPERIMENT)
CPS	CYCLES PER SECOND
CS	CENTRAL STATION
CTL	CONTROL
CVR	COVER
CVW	COMMAND VERIFICATION WORD
DB	DECIBELS
DBM	DECIBELS WITH RESPECT TO ONE MILLIWATT
DC	DIRECT CURRENT
DEC	DECODER
DET	DETECTOR
DIG	DIGITAL
DIR/V	DIRECTION AND SPEED (USED ON PSE)
DISSIP	DISSIPATION
DLAY	DELAY
D/P	DATA PROCESSOR
DPLY	DEPLOY
DRT	DOME REMOVAL TOOL
DSS	DATA SUBSYSTEM-- COMPONENTS INCLUDE DSS/A ANALOG DATA PROCESSOR DSS/D DIGITAL DATA PROCESSOR DSS/PROC COMPLETE DATA PROCESSOR (REDUNDANT)
EPS	ELECTRICAL POWER SYSTEM
EXP	EXPERIMENT
F	FAHRENHEIT
FET	FIELD EFFECT TRANSISTOR
FLD	FIELD
FREQ	FREQUENCY
FTT	FUEL TRANSFER TOOL
GDT	GRADIENT SENSOR DELTA TEMPERATURE (HFE)
GEO	GEOPHONE
GMBL	GIMBAL
GND	GROUND
GT	GRADIENT SENSOR AMBIENT TEMPERATURES (HFE)
HBR	HIGH BIT RATE

REV	ITEM

HFE	HEAT FLOW EXPERIMENT
HTR	HEATER--- ON HFE THERE ARE TWO CASES--- HTR/HK HIGH CONDUCTIVITY HEATER HTR/LK LOW CONDUCTIVITY HEATER
HT/S	HEAT SINK
HV	HIGH VOLTAGE
HZ	HERTZ
INST	INSTRUMENT
INSUL	INSULATION
INT	INTERNAL
K	KELVIN
KC	KILOCYCLES
KHZ	KILOHERTZ
KV	KILOVOLTS
LAT	LATITUDE
LBR	LOW BIT RATE
LM	LUNAR MODULE
LONG	LONGITUDE
L/O	LOCAL OSCILLATOR
LOS	LOSS OF SIGNAL
LP	LONG PERIOD (PSE SENSORS)
LSB	LEAST SIGNIFICANT BIT
LSD	LEAST SIGNIFICANT DATA
LSM	LUNAR SURFACE MAGNETOMETER
LVL	LEVEL
MA	MILLIAMPERE
MADC	MILLAMPERES DC
MAP	MESSAGE ACCEPTABLE PULSE
MC	MEGACYCLE
MCC	MISSION CONTROL CENTER
MDE	MODE
MEV	MILLION ELECTRON VOLTS
MHZ	MEGAHERTZ
MOCR	MISSION OPERATIONS CONTROL ROOM
MOD	MODULE
MODE	OPERATING MODES ARE DIFINED AS FOLLOWS--- FOR HFE MODE/G GRADIENT MODE MODE/HK HIGH CONDUCTIVITY MODE MODE/LK LOW CONDUCTIVITY MODE
MS	MILLISECOND
MSB	MOST SIGNIFICANT BIT
MSD	MOST SIGNIFICANT DATA
MSFN	MANNED SPACE FLIGHT NETWORK
MTR	MOTOR-- ON PSE, THE THREE MOTORS ARE MTRX, MTRY, AND MTRZ
MUX	MULTIPLEX
MV	MILLIVOLTS
MW/CM2	MILLIWATTS PER SQUARE CENTIMETER
NA	NANOAMPERS
OSC	OSCILLATOR
PA	POWER AMPLIFIER
PA	PICOAMPERES
PCM	PULSE CODE MODULATION
PCU	POWER CONDITIONING UNIT
PDR	POWER DISSIPATION RESISTOR
PDU	POWER DISTRIBUTION UNIT
PET	PACKAGE ELAPSED TIME
PHYS	PHYSICAL-- ON CPE USED AS FOLLOWS-- PHYS/AN PHYSICAL ANALYZER (SENSOR ASSEMBLY)
PLT	PLATE
PM	PHASE MODULATION
PRE/LIM	PRE-LIMITING
P/S	POWER SUPPLY
PSE	PASSIVE SEISMIC EXPERIMENT-- ALSO-- PSE/LP LONG PERIOD SENSORS PSE/SP SHORT PERIOD SENSORS PSE/LP/SP LONG AND SHORT PERIOD SENSORS LONG PERIOD SENSORS ARE FURTHER DEFINED AS PSE/X, PSE/Y, AND PSE/Z WHILE PSE/XY DENOTES THE TWO HORIZONTAL LONG PERIOD SENSORS
R	RESISTOR (USED AS R1 AND R2)
RCVR	RECEIVER
RDT	RING SENSOR DELTA TEMPERATURE (HFE)

REV	ITEM

RF	RADIO FREQUENCY
RST	RESET
RT	RING SENSOR AMBIENT TEMPERATURE (HFE)
RTC	REAL-TIME COMMAND
RTG	RADIOISOTOPE THERMOELECTRIC GENERATOR
SCI	SCIENTIFIC
SEQ	SEQUENCE, SEQUENTIAL-- USED ON HFE AS--- SEQ/FUL FULL SEQUENCE SEQ/P1 PROBE 1 SEQUENCE SEQ/P2 PROBE 2 SEQUENCE USED ON ASE AS--- SEQ/S SEQUENTIAL SINGLE
SEQ	SCIENTIFIC EQUIPMENT
SNSR	SENSOR
SP	SHORT PERIOD (PSE SENSOR)
SPST	SINGLE POLE SINGLE THROW
S/S	SAMPLES PER SECOND, SIGNAL STRENGTH
SWS	SOLAR WIND SPECTROMETER
SYNC	SYNCHRONIZATION
TC	THERMOCOUPLE (ON HFE, FOUR CABLE AMBIENT TEMPERATURES ARE READ ON EACH PROBE)
TM	TELEMETRY
USB	UNIFIED S-BAND
V	VELOCITY, (USED TO INDICATE ''SPEED'' ON PSE IN ''LVL DIR/V'')
VCO	VOLTAGE CONTROLLED OSCILLATOR
V/FILT	VELOCITY FILTER, A COMPONENT OF SIDE
W	WATTS
W1, W2 W3	WALL LOCATIONS OF STRUCTURE TEMPERATURE SENSORS
XMTR	TRANSMITTER
XTAL	CRYSTAL
XYZ	AXES OF LSM, WHERE XYO INDICATES
XYO	X, OR Y, OR NEITHER

REV	ITEM
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	ATOMIC ENERGY COMMISSION ZS5/REMINI, W.C. (2)

REV	ITEM

' CHANGE CONTROL '

1.0 INTRODUCTION

1.1 PURPOSE

THE PURPOSE OF THIS APPENDIX IS TO DELINEATE CHANGE CONTROL PROCEDURES FOR THE ALSEP MISSION RULES. THIS WILL INSURE THE PROPER COORDINATION OF CHANGES, PROVIDE A RECORD OF PROPOSED CHANGES (INCLUDING THE RATIONALE FOR MAKING THEM), AND WILL PROVIDE A MEANS FOR PROMULGATING INDIVIDUAL RULE UPDATES BETWEEN REVISIONS (INTERIM CHANGES).

1.2 EFFICTIVITY

MARCH 23, 1970.

2.0 CHANGE PROCEDURES

2.1 SUBMISSION OF CHANGES

PROPOSED CHANGES ARE SOLICITED FROM ANY INDIVIDUAL OR ORGANIZATION HAVING A VALID INPUT. ALL CHANGES WILL BE SUBMITTED DIRECTLY TO THE CHIEF, FLIGHT CONTROL OPERATIONS BRANCH (FCOB), FCD.

2.1.1 FORMAT

PERSONS DESIRING TO SUBMIT A PROPOSED CHANGE WILL REDLINE A PAGE FROM THIS DOCUMENT OR REWRITE THE RULE, USING THE STANDARD MISSION RULE FORMAT. ALL PROPOSED CHANGES WILL BE SUPPORTED BY RATIONALE. TWO COPIES WILL THEN BE FORWARDED TO FCOB.

2.2 APPROVAL

2.2.1 COORDINATION

THE ORIGINATOR OF THE CHANGE MAY OBTAIN PRELIMINARY CONCURRENCES. FCOB WILL OBTAIN FORMAL CONCURRENCES FROM THE CHIEF EXPERIMENTS SYSTEMS BRANCH, CHIEF FLIGHT CONTROL DIVISION.

2.2.3 DISAPPROVED CHANGES

IF A CHANGE IS DISAPPROVED FCOB WILL RETURN THE COPY TO THE ORIGINATOR. A COPY OF THE REQUESTED CHANGE WILL BE RETAINED FOR FUTURE REFERENCE.

2.3 PUBLICATION AND DISTRIBUTION OF INTERIM CHANGES

INTERIM CHANGES WILL BE DISTRIBUTED VIA AN ABBREVIATED DISTRIBUTION LIST CONSISTING OF THE MISSION CONTROL TEAM, PERTINENT NASA ORGANIZATIONS, AND THE APPROPRIATE CONTRACTOR(S).

3.0 REVISIONS

3.1 DEVELOPMENT

FCOB WILL COMPILE THE EFFECTIVE INTERIM CHANGES AND CORRECTIONS OF MINOR TYPOGRAPHICAL ERRORS INTO COMPLETE PAGE CHANGES TO THE BASIC DOCUMENT. (''PEN AND INK'' CHANGES MAY BE USED TO CORRECT TYPOGRAPHICAL ERRORS IF THERE ARE NO OTHER CHANGES ON THE PAGE CONCERNED.)

3.2 APPROVAL

ALL REVISIONS WILL BE APPROVED BY THE DIRECTOR OF FLIGHT OPERATIONS AND THE MANAGER, APOLLO SPACECRAFT PROGRAM.

3.3 PUBLICATION

3.3.1 SCHEDULE

REVISIONS WILL BE MADE ON AN ''AS REQUIRED'' BASIS.

3.3.2 DISTRIBUTION

REVISIONS WILL BE PRINTED AND DISTRIBUTED ACCORDING TO APPENDIX B.

APOLLO

FSMR

FINAL SYSTEMS MISSION RULES

APOLLO 13

APOLLO LUNAR SURFACE EXPERIMENTS PACKAGE

ALSEP 3

MARCH 23, 1970

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